

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-286546

(43)Date of publication of application : 16.10.2001

BEST AVAILABLE COPY

(51)Int.Cl. A61L 9/14  
 A61L 9/01  
 A61L 9/22  
 B03C 3/00  
 B03C 3/02  
 B05B 5/025  
 B05D 1/04

(21)Application number : 2000-105977

(71)Applicant : RICOH ELEMEX CORP

(22)Date of filing : 07.04.2000

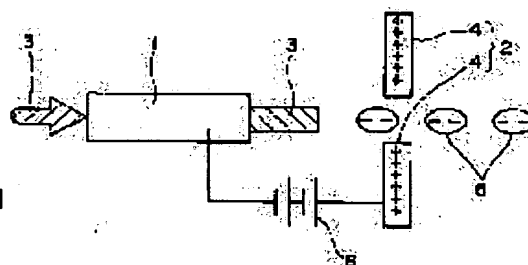
(72)Inventor : FUJIYAMA YUICHI  
 MIZUNO AKIRA

## (54) DEODORANT SPRAYER

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a deodorant sprayer that can spray a liquid deodorant over a wide area through electrostatic atomization and can save the consumption of the deodorant through efficient spraying.

SOLUTION: The deodorant sprayer comprises a nozzle 1 for jetting a liquid deodorant, a charging part 2 for forming a high-voltage electric field, and a high-voltage power source 6 for charging the charging part 2. The deodorant 3 jetted from the nozzle 1 is electrostatically atomized in the charging part 2, from which it is sprayed as a charged particulate waterdrop 5.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision]

**THIS PAGE BLANK (USPTO)**

---

## CLAIMS

---

[Claim(s)]

[Claim 1] The deodorant atomiser characterized by coming to have the nozzle which injects a liquefied deodorant, and the live part which forms the electric field of the high voltage in order to electrify static electricity in the deodorant injected now and to atomize it to it.

[Claim 2] The deodorant atomiser according to claim 1 characterized by the antioxidant being mixed by the deodorant.

[Claim 3] The deodorant atomiser according to claim 1 or 2 characterized by the germicide being mixed by the deodorant.

[Claim 4] The deodorant atomiser according to claim 1, 2, or 3 characterized by equipping the deodorant and coincidence which were electrified and were sprayed with the electrostatic adsorption section for adsorbing a floating fine particle etc. with static electricity.

[Claim 5] A live part is a deodorant atomiser according to claim 1, 2, 3, or 4 characterized by making it charged so that the deodorant sprayed may be electrified [ of minus ].

[Claim 6] A live part is a deodorant atomiser according to claim 1, 2, 3, or 4 characterized by making it charged so that the deodorant sprayed may be electrified [ of the amphipathy of plus minus ] by impressing the alternating current high voltage.

[Claim 7] The deodorant atomiser according to claim 1, 2, 3, 4, 5, or 6 characterized by building a nozzle and a live part in an air cleaner.

---

## DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention can be used about the deodorant atomiser which sprays a deodorant, being built in an air cleaner, a deodorization machine, etc.

[0002]

[Description of the Prior Art] In the location with many amounts of smoking of tobacco, such as a smoking place, or the location which odor gas generates, since smoke and an odor are full, the air cleaner, the deodorization machine, etc. are

installed for the removal. However, the satisfying engine performance is not demonstrated about deodorization. Moreover, if the stinking matter adheres to clothing, a carpet, a wall, etc., it is difficult to remove in an air cleaner, and even after separating from a smoking place etc., a smell adheres to clothing, and it is unpleasant.

[0003]

[Problem(s) to be Solved by the Invention] Conventionally, in order to remove the smell adhering to clothing etc., the deodorant was sprayed on clothing with the atomizer etc., and the smell is masked or removed. However, when a liquid is sprayed with an atomizer, the particle size of a liquid is large, and since there is much spray nonuniformity, the present condition is that the deodorant is not used effectively. Moreover, since the particle size of a liquid is large, the time amount to which the speed which falls on a floor or the ground is quick, and is floating is short, and cannot adhere to backgrounds, such as clothing, easily.

[0004] By the way, the technique of electrostatic atomization is applied to various fields, such as paint and crop dusting. When electrostatic atomization impresses the high voltage to a liquid and a liquid is exposed into electric field, it is the phenomenon in which water atomizes. If the electric field on the front face of a liquid become large, many microparticulate drops will generate this structure according to the electrostatic force committed on a front face. Since the drop will be charged in the like pole while the surface area per unit mass becomes large if a liquid atomizes, a liquid is sprinkled by repulsive force in the large range.

[0005]

[Means for Solving the Problem] Then, this invention proposes the deodorant atomiser which can solve an above-mentioned trouble by applying the technique of electrostatic atomization to the deodorant of a liquid paying attention to the technique of such electrostatic atomization.

[0006] That is, the deodorant atomiser by this invention comes to have the nozzle which injects a liquefied deodorant, and the live part which forms the electric field of the high voltage in order to electrify static electricity in the deodorant injected now and to atomize it to it.

[0007] If electrostatic atomization of the deodorant of a liquid is carried out, while particle size becomes small, in order that repulsive force may work in static electricity, the liquid which carried out electrostatic atomization when static electricity was charged in a deodorant reaches far and wide, and can be sprayed. Moreover, since the sprayed liquid wears static electricity, it can be made to adhere

also to the background of clothing. A deodorant is effectively used by these reasons, reduction of the amount of the deodorant used is expected, and the residual substance and product of a deodorant can be lessened further.

[0008] The active oxygen leading to the photochemical smog represented by ozone exists in atmospheric air, and has a possibility of remaining once it is incorporated indoors. When people attract the active oxygen which remained indoors, there is a possibility of having a bad influence on the body. It is desirable to remove active oxygen out of air for these reasons.

[0009] Then, invention concerning claim 2 mixes an antioxidant to a deodorant. By carrying out electrostatic atomization of the oxygen inhibitor into air with a deodorant, the active oxygen which is piling up into air can be removed now. If an antioxidant like vitamin C (ascorbic acid) has active oxygen, it will autolyze, and it has the work which neutralizes active oxygen.

[0010] It piles up indoors, and the symptoms is shown in \*\* and illness, or a disease germ and a virus cause secondary infection in the location in which men, such as a school and a hospital, gather. Moreover, when the symptoms is shown by the microorganism and virus whose antibiotics, such as MRSA, are not effective, since people die, an immediate cure is required. In order to remove an airborne microbe and a virus, mechanical filters, such as a HEPA filter, are used. However, since there are not sterilization and a disinfection function, a microorganism breeds, and a filter has fear of secondary infection for the reasons of a re entrainment etc.

[0011] Then, invention concerning claim 3 mixes a germicide to a deodorant. The airborne microbe and virus in air can be removed now by carrying out electrostatic atomization of the germicide with a deodorant.

[0012] Since current indoor environment has high airtightness, when polluted by a fixed particle and harmful gas, it will pile up indoors. Although the air cleaner, the deodorization machine, etc. are used as the cure, satisfactory effectiveness is not acquired in the condition that the pollutant is always discharged.

[0013] So, the deodorant and coincidence which were electrified and were sprayed are equipped with the electrostatic adsorption section for adsorbing a floating fine particle etc. with static electricity in invention concerning claim 4.

[0014] Since the liquid charged with electrostatic atomization gives a charge to a floating fine particle and harmful gas, the harmful matter which was able to give the charge comes to be drawn to the field grounded, and can be removed out of air.

[0015] Most anion generators marketed are electrifying the charge of minus INAN to air. Since the dielectric constant of air is low, the effectiveness which it is difficult

for you to make it charged efficiently, and an anion has cannot fully be demonstrated. Moreover, products, such as ozone, are produced.

[0016] So, in invention concerning claim 5, a live part is electrified so that the deodorant sprayed may be electrified [ of minus ].

[0017] Although it may be important to impress the high voltage and a positive electrode, a negative electrode, or whichever is sufficient as the polarity of the electrical potential difference to impress in case electrostatic atomization of the liquid is carried out, the charge of minus can be electrified into a liquid by changing the polarity of the high voltage. Moreover, compared with air, since the dielectric constant is high, the sprayed liquid can be electrified efficiently. It can also have the effectiveness of an anion now in the effect of the invention and coincidence concerning claims 1-4 at coincidence.

[0018] Most electric discharge machines marketed electrified the charge of plus and minus to air, and it has removed air and static electricity of a wall. Since the dielectric constant of air is low, it is difficult to electrify a charge efficiently and it produces products, such as ozone.

[0019] So, in invention concerning claim 6, by impressing the alternating current high voltage, a live part is electrified so that the deodorant sprayed may be electrified [ of the amphipathy of plus minus ].

[0020] In case electrostatic atomization of the liquid of a deodorant is carried out, the charge of the amphipathy of plus minus can be electrified for the waterdrop of a particle by making the high voltage into alternating voltage. Moreover, compared with air, since the dielectric constant is high, the liquid by which electrostatic atomization was carried out can be electrified efficiently. The sprayed liquid can have the effectiveness of electric discharge in coincidence.

[0021] When carrying out direct electrostatic atomization and spraying a germicide and a deodorant indoors, it is necessary to manage the amount which is floating indoors depending on the sprayed liquid.

[0022] Then, invention concerning claim 7 builds a nozzle and a live part in an air cleaner, and becomes manageable [ the amount of the deodorant which is emitted to air clarification outside the plane, and floats indoors ] by equipping equipment and the function of invention which relate to the interior of an air cleaner at claims 1-5.

[0023]

[Embodiment of the Invention] Next, the gestalt of implementation of this invention is explained according to a drawing.

[0024] Drawing 1 shows the outline configuration of the deodorant atomiser by this

invention, and consists of the nozzle 1 which injects a liquefied deodorant, a live part 2 which forms the electric field of the high voltage in order to electrify static electricity in the deodorant injected now and to atomize it to it, and a high-voltage power source 6 which electrifies that live part 2. By carrying out electrostatic atomization of the water column 3 of the deodorant injected from a nozzle 1 by the dielectric charging method with the electrification electrode 4, that is, passing the electric field of the high voltage, the live part 2 of this example makes particle size small, and sprays it as waterdrop 5 of the electrified particle.

[0025] Drawing 2 is the example, and according to the high-voltage power source 6, a nozzle 1 is made into a plus pole, by making the electrification electrode 4 into a minus pole, a part of nozzle 1 is made to rush in into the electrification electrode 4 of a cylindrical shape, and it carries out [ it impresses the high voltage, electrifies in minus the waterdrop 5 of the particle of the deodorant injected from a nozzle 1 and ] electrostatic atomization. Thus, the anion effectiveness can also be demonstrated when electrifying minus.

[0026] By mixing antioxidants and germicides, such as vitamin C, carrying out electrostatic atomization and spraying these on a deodorant at coincidence, the active oxygen which is piling up into air with the antioxidant can be removed, or it can sterilize with a germicide.

[0027] If an alternating current high-voltage power source is used as a high-voltage power source 6, the charge of the amphipathy of plus minus is electrified for the waterdrop 5 of a particle, and electricity can be discharged now. If the grounded electrostatic adsorption section (not shown) is installed in the point of the live part 4 by the electrification electrode 4, adsorption recovery of the floating fine particle in air etc. can be carried out with static electricity at the waterdrop 5 and coincidence of a deodorant.

[0028] If the high voltage is directly impressed to nozzle 1 the very thing as shown in drawing 3 , a deodorant can be directly electrified in spraying and coincidence with a nozzle 1 by making nozzle 1 the very thing into a live part. It can be used being able to build both the structure of drawing 2 , and the structure of drawing 3 in an air cleaner.

[0029]

[Effect of the Invention] According to invention of claim 1, the amount of the deodorant used can be saved by carrying out electrostatic atomization of the deodorant of a liquid, and being able to spray broadly, and spraying efficiently.

[0030] Since an antioxidant can decompose the active oxygen which is in air by

mixing antioxidants, such as vitamin C, to a deodorant according to invention of claim 2, decomposition removal of the active oxygen in air can be carried out.

[0031] According to invention of claim 3, the saprophytic bacteria which are floating in air can be sterilized by making a deodorant mix a germicide and giving a germicidal action to the deodorant atomized.

[0032] According to invention of claim 4, the deodorant which carried out electrostatic atomization can carry out adsorption treatment of dust and harmful gas which gave the charge to dust and harmful gas which have a charge and are floating in air, and were able to give the charge out of air in the electrostatic adsorption section.

[0033] Since according to invention of claim 5 electrostatic atomization is carried out so that it may be electrified [ of minus of a deodorant ], the anion effectiveness is also expectable in coincidence.

[0034] Since according to invention of claim 6 electrostatic atomization is carried out so that it may have the charge of both pluses and minus of a deodorant, the charge which exists in a nature can be offset and discharged.

[0035] While it can respond to various indoor environment by equipping the interior of an air cleaner with the equipment concerning claims 1-6 according to invention of claim 7, it can prevent emitting the atomized deodorant to direct indoor environment.

---

## DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram of the deodorant atomiser by this invention.

[Drawing 2] It is the outline perspective view of the example.

[Drawing 3] It is drawing showing other examples of a configuration.

[Description of Notations]

1 Nozzle

2 Live Part

3 Water Column

4 Electrification Electrode

5 Waterdrop

6 High Voltage Power Supply



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**

**THIS PAGE BLANK (USPTO)**